**Testing the Effectiveness of Antacids: Put Out the Fire!**

**Introduction**

In this exercise, students will have the opportunity to design an experiment to test the effectiveness of antacids.

**Expectations:** SNC 2P: C 2.7, C 3.4, C 3.5.

**Activity**

Since there are several possible variables, students can be split into various groups (2-4 people per group) and given various amounts of different antacids which they can compare. For example, different groups can test the effectiveness of: dosage per dosage of tablets; dosage per dosage of liquids; gram per gram of tablets; mL per mL of liquids; dosage per dosage of tablets versus liquids. Students will then have to determine the cost effectiveness of each product they tested and make a final recommendation. This will represent the literacy and numeracy components to the task.

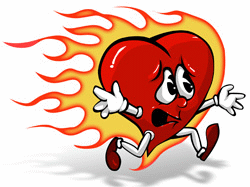
* As a class, the students should determine what makes an antacid effective. After they have come up with an answer, they can determine a course of action and then have you approve it before beginning.
* How to determine the unit cost of the antacid products should also be discussed as a class to ensure that all students have the tools for successfully completing this task.

**Materials**

Students will need: beakers, goggles, Hydrochloric acid (0.15 M) [approximately 100 mL for each antacid), pH paper and/or universal indicator and various antacids to test.

**Safety Considerations**

Due to the presence of acid, students must wear goggles. Other general concerns make include proper handling of glassware.

**PUT OUT THE FIRE!**

Oh no! Your friend has eaten too much spicy food and now they’re experiencing a sharp, burning feeling in their chest. This condition, which happens when your stomach makes too much acid, is called heartburn. “Make this pain stop!” your friend shouts. Well not to worry! There are medications called **antacids** that they can take to put out that fiery feeling!

**Task:**

You’ve gone to the store and looking to buy one of these so-called, ‘antacids.’ However, you soon see that there are so many types! You are a hard worker and don’t want to waste your money on one brand that isn’t going to work. You and your group must test which one is the best and then make a recommendation based on your experiment.

1. Get two beakers and fill them with 100 mL of the acid solution which your teacher has provided for you. This will represent your stomach!
2. Choose the two antacids you’d like to compare and plan how you’ll compare them. Write up the plan and give it to your teacher for approval. You can choose one of the following options or come up with your own.
   1. Compare the recommended dosage of one brand versus another
   2. Compare the same amount of antacids between brands

**Antacid 1: Antacid 2:**

**Amount (grams, dosage, mL): Amount (grams, dosage, mL):**

1. Once it’s been approved you’re ready to go!
2. Add the two antacids to different beakers containing the acid solution.
3. Mix the solution and let it sit for 1 minute.
4. Time to test! Test the solutions using the pH paper to see which one is the most effective at neutralizing the acid.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name of antacid** | **Amount (g)/ mL/ number of tablets** | **pH of acid before adding antacid** | **pH after adding antacid** | **Unit cost of each amount (show work)\*** |
|  |  |  |  | Total cost:  Cost/amount: |
|  |  |  |  | Total cost:  Cost/amount: |

\* Example: A package of 200 tablets of Tums costs $4.00.

The cost of one dosage (2 tablets) of Tums = Total cost/number of tablets

= $4.00/ 200 tablets

= $0.02/tablet x 2 tablets

= $0.04 for 2 tablets.

1. **Make your recommendation!**

Which antacid worked the best at neutralizing the antacid? How do you know?

­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which antacid was the most cost effective (worked the best for the least unit cost)?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Are there are properties of antacids that were not considered in this experiment that maybe should have been?

­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_